

Owner's Manual

2-lines display Scientific Calculator

with fractional, statistical, formula memory, integration functions

Please read before using.

Safety Precautions

Be sure to read the following safety precautions before using this calculator. Keep this manual handy for later reference.

Batteries

- After removing the batteries from the calculator, put them in a safe place where there is no danger of them getting into the hands of small children and accidentally swallowed.
- Keep batteries out of the reach of children. If accidentally swallowed, consult with a physician immediately.
- Never charge batteries, try to take batteries apart, or allow batteries to become shorted. Never expose batteries to direct heat or dispose of them by incineration.
- Misuse of batteries can cause them to leak acid that can cause damage to nearby items and creates the possibility of fire and personal injury.
- Always make sure that a battery's positive (+) and negative (-) sides are facing correctly when you load it into the calculator.
- Remove the batteries if you do not plan to use the calculator for a long time.
- Use only the type of batteries specified for this calculator in this manual.

Disposing of the Calculator

- Never dispose of the calculator by burning it. Doing so can cause certain components to suddenly burst, creating the danger of fire and personal injury.
- The displays and illustrations (such as key markings) shown in this Owner's Manual are for illustrative purposes only, and may differ somewhat from the actual items they represent.
- The contents of this manual are subject to change without notice.

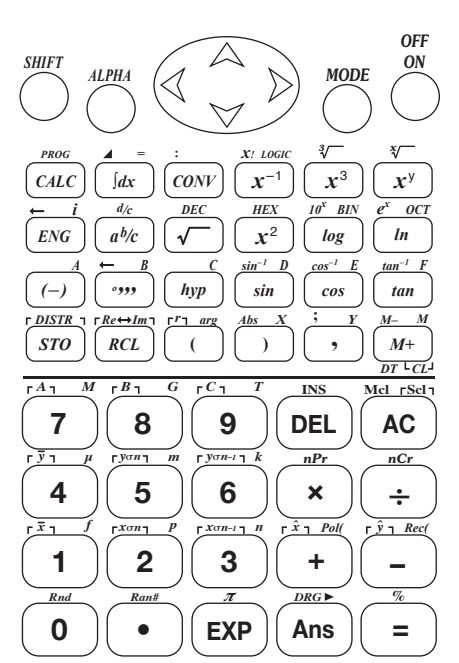
Handling Precautions

- Be sure to press the "ON" key before using the calculator for the first time.
- Even if the calculator is operating normally, replace the battery at least once every three years. Dead battery can leak, causing damage to and malfunction of the calculator. Never leave the dead battery in the calculator.
- The battery that comes with this unit discharges slightly during shipment and storage. Because of this, it may require replacement sooner than the normal expected battery life.
- Low battery power can cause memory contents to become corrupted or lost completely. Always keep written records of all important data.
- Avoid use and storage in areas subjected to temperature extremes. Very low temperatures can cause slow display response, total failure of the display, and shortening of battery life. Also avoid leaving the calculator in direct sunlight, near a window, near a heater or anywhere else it might become exposed to very high temperatures. Heat can cause discoloration or deformation of the calculator's case, and damage to internal circuitry.
- Avoid use and storage in areas subjected to large amounts of humidity and dust. Take care never to leave the calculator where it might be splashed by water or exposed to large amounts of humidity or dust. Such elements can damage internal circuitry.
- Never drop the calculator or otherwise subject it to strong impact.
- Never twist or bend the calculator. Avoid carrying the calculator in the pocket of your trousers or other tight-fitting clothing where it might be subjected to twisting or bending.
- Never try to take the calculator apart.
- Never press the keys of the calculator with a ball-point pen or other pointed object.
- Use a soft, dry cloth to clean the exterior of the unit. If the calculator becomes very dirty, wipe it off with alcohol moistened in a weak solution of water and a mild neutral household detergent. Wring out all excess moisture before wiping the calculator. Never use thinner, benzene or other volatile agents to clean the calculator. Doing so can remove printed markings and damage the case.

Two-lines Display

You can simultaneously check the calculation formula and its answer. The first line displays the calculation formula. The second line displays the answer.

Keys Layout



Before Starting Calculations

Operation Modes
When using this calculator, it is necessary to select the proper mode to meet your requirements. This can be done by pressing [MODE] to scroll through sub-menus. Then select the appropriate mode by keying in the number.

Press [MODE] once to read the first page of the main menu.
Press [MODE] again.
Press [MODE] again.
Press [MODE] further.
Press [MODE] again.

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"BASE-N" mode

"BASE-N" mode [MODE] [MODE] [3] :- binary, octal, decimal, hexadecimal conversion and calculations, as well as logical operations can be carried out.

Angular Measurement Modes

"DEG" mode [MODE] [MODE] [MODE] [1] :- specify measurement in "degrees". "D" symbol appears in display window.
"RAD" mode [MODE] [MODE] [MODE] [2] :- specify measurement in "radians". "R" symbol appears in display window.
"GRA" mode [MODE] [MODE] [MODE] [3] :- specify measurement in "grads". "G" symbol appears in display window.

Display Modes

"Fix" mode [MODE] [MODE] [MODE] [MODE] [1] :- specify number of decimal places. "FIX" symbol appears in display window.
"Sci" mode [MODE] [MODE] [MODE] [MODE] [2] :- specify number of significant digits. "SCI" symbol appears in display window.
"NORM" mode [MODE] [MODE] [MODE] [MODE] [3] :- cancels "Fix" and "Sci" specifications. This operation also changes the range of the exponent display. When the results exceed the following limits, exponent is to be displayed.

Norm 1 :- 10⁻² > |x|, or |x| ≥ 10¹⁰
Norm 2 :- 10⁻⁹ > |x|, or |x| ≥ 10¹⁰

In combination with "Fix", "Sci" or "Norm" mode, you can cause the exponent display for the number being displayed to change in multiples of 3 by selecting engineering display mode in the sub-menu.

"Eng" mode

"Eng" mode [MODE] [MODE] [MODE] [MODE] [MODE] [1] :- "ENG" symbols appears in display window when this mode is selected.
Or you can deselect engineering display mode by pressing [MODE] [MODE] [MODE] [MODE] [MODE] [2]. The "ENG" symbol will be OFF.

Calculation Priority Sequence

This calculator employs true algebraic logic to calculate the parts of a formula in the following order :-
1. Coordinate transformation / integration, Pol(x, y), Rect(r, θ), f(x), f(y).
2. Type A functions :- These functions are those in which the value is entered and then the function key is pressed, such as x², x³, x^{1/x}, x!, nPr, Engineering symbols.
3. Power / root, x^y, √
4. Fractions, a/b/c
5. Abbreviated multiplication format in front of π, memory or parenthesis, such as 2π3, A log2, etc.
6. Type B functions :- These functions are those in which the function key is pressed and then the value is entered such as √, √³, log, ln, e^x, 10^x, sin, cos, tan, sin⁻¹, cos⁻¹, tan⁻¹, sinh, cosh, tanh, sinh⁻¹, cosh⁻¹, tanh⁻¹, Int, Frac, Abs, (-), (following in BASE-N mode only) d, h, b, o, Neg, Not.
7. Abbreviated multiplication format in front of Type B functions, such as 2π3, A log2, etc.
8. Remuneration, combination, nPr, nCr
9. x², x³, x^{1/x}
10. +, -, ×, ÷ (in BASE-N mode only)
11. or, xor, nor (in BASE-N mode only)
12. or, xor, nor (in BASE-N mode only)

When functions with the same priority are selected in series, execution is performed from right to left :- e^{ln(1/20)} = e^{ln(1)/20}. Otherwise, execution is from left to right.
Operations enclosed in parentheses are performed first.

The following error messages will be displayed for the operations listed above:-
Ma ERROR case (4)
Stk ERROR case (5)
Syn ERROR

Besides pressing [AC] when an error occurs, you can also press [ON] key to clear the error.

Number of Input Characters

This calculator features a 79-step area for calculation execution. One function comprises one step. Each press of numeric or +, -, ×, ÷ keys comprise one step. Though such operations as [SHIFT] [x²] (x² key) require two key operations, they actually comprise only one function, and, therefore, only one step. These steps can be confirmed using the cursor. With each press of the [←] or [→] key, the cursor is moved one step.

Input characters are limited to 79 steps. Usually, the cursor is represented by a blinking " _ ".
When numeric values or calculation commands are input, they appear on the display from the left. Calculation results, however, are displayed from the right.

Corrections

To make corrections in a formula that is being input, use the [←] and [→] keys to move to the position of the error and press the correct keys.
Example: To change an input of 122 to 123 :-
[1] [2] [2] = 122 _

[←] = 122 _

[3] = 123 _

Example: To change an input of cos60 to sin60 :-
[cos] [6] [0] = cos 60 _

[←] [←] [←] [←] = cos 60 _

[sin] = sin 60 _

If after making corrections, input of the formula is complete, the answer can be obtained by pressing [=]. If, however, more is to be added to the formula, advance the cursor using the [←] key to the end of the formula or input.

If an unnecessary character has been included in a formula, use the [←] and [→] keys to move to the position of the error and press the [DEL] key. Each press of [DEL] will delete one command (one step).

Example: To correct an input of 369 × 2 to 369 × 2.2 :-
[3] [6] [9] [×] [2] = 369 × 2 _

[←] [←] [←] [←] [2] [.] = 369 × 2 _

[←] [←] [←] [←] [←] [←] [2] [.] = 3.62 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

[←] [←] [←] [←] [←] [←] [2] [.] = 2.362 _

Syn ERROR is generated when an attempt is made to input a substitution formula (such as C = A×B) or multistatements (such as A×B :> C×D), and the existing memory contents are retained.

When input is made in a format such as "A=log2", where the variable is equal to the formula, the results of the calculation are input into the specified memory.

Example: Executing "A=log2" :-
[AC] [ALPHA] [A] [ALPHA] [=]
[log] [2]
A=log2 _

[←] = A=log2 0.301029995 _

[AC] = _

[RCL] [A] = A= 0.301029995 _

Deleting memories
To delete all contents of variable memories, press [Shift] followed by [MC] [=].

Independent Memory
Addition and subtraction (to and from sum) results can be stored directly in memory. Results can also be totaled in memory, making it easy to calculate sums. The icon "M" will be lighted as long as M is not empty.

Example: Input 123 to independent memory.
[AC] [1] [2] [3] = 123 _

[M+] = 123 123 _

[AC] = _

[RCL] [M] = M= 123 _

Add 25, subtract 12
25 [M+] 12 [Shift] [M-] = 12 12 _

Recall memory data
[AC] = _

[RCL] [M] = M= 136 _

To clear memory contents, press [0] [STO] [M].

Addition/subtraction to or from sum in memory cannot be carried out with [M+] [Shift] [M-] keys in SD mode and REG mode.

Difference between [STO] [M] and [M+], [Shift] [M-] :-
Both [STO] [M] and [M+], [Shift] [M-] can be used to input results into memory, however when the [STO] [M] operation is used, previous memory contents are cleared. When either [M+] or [Shift] [M-] is used, value is added or subtracted to or from present sum in memory.

Example: Input 456 into memory "M" using [STO] [M] procedure. Memory already contains value of 123.
[AC] [1] [2] [3] [STO] [M] = M= 123 _

[AC] [4] [5] [6] [STO] [M] = M= 456 _

[AC] = _

[RCL] [M] = M= 456 _

Example: Input 456 into memory "M" using M+. Memory already contains value of 123.
[AC] [1] [2] [3] [STO] [M] = M= 123 _

[AC] [4] [5] [6] [M+] = 456 456 _

[AC] = _

[RCL] [M] = M= 579 _

Specifying the Number of Significant Digits
This specification is used to automatically round intermediate results and final results to the number of digits you have specified.

As with the number of decimal places, displayed results are rounded to the specified number of digits, but stored results are normally not rounded.

To specify the number of significant digits (Sci), press [MODE] [MODE] [MODE] [MODE] [2] and then a value indicating the number of significant digits (0-9) to set from 1 to 10 digits with "0" indicating 10 digits. The "SCI" indicator will appear on the display.

Example: Input 123 into memory "A" :-
[AC] [1] [2] [3] = 123 _

[STO] [A] = A= 123 _

[AC] = _

[RCL] [A] = A= 123 _

When formulas are input, the result of the formula's calculation is retained in memory.

Example: Input the result of 123×456 into memory "B" :-
[AC] [1] [2] [3] [×] [4] [5] [6] = 123 × 456 _

[STO] [B] = B= 56088 _

[AC] = _

[RCL] [B] = B= 56088 _

If a variable expression is entered, the expression is first calculated according to the values stored in the variable memories used in the expression. The result is then stored in the variable memory specified for the result.

Example: Input the results of A×B into memory "C" :-
[AC] [ALPHA] [A] [×] [ALPHA] [B] = A × B = 56088 _

[STO] [C] = C= 6898824 _

[AC] = _

[RCL] [C] = C= 6898824 _

Continuous Calculation Function
Even if calculations are concluded with the [=] key, the result obtained can be used for further calculations.
Example: To calculate = 3.14 continuing after 3×4=12
[AC] [3] [×] [4] [=] = 3 × 4 = 12 _

(continuing) [1+] [3] [÷] [1] [4] = Ans + 3 = 14 _

[=] = Ans + 3 = 14 3.821656051 _

[=] = Ans + 3 = 14 3.821656051 _

(continuing) [x²] = Ans² _

[=] = Ans² = 169 _

[←] = 123 × 456 _

[=] = 123 × 456 56088 _

[←] = 123 × 456 _

[←] = 123 × 456 56088 _

[←] = 123 × 456 _

[←] = 123 × 456 56088 _

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